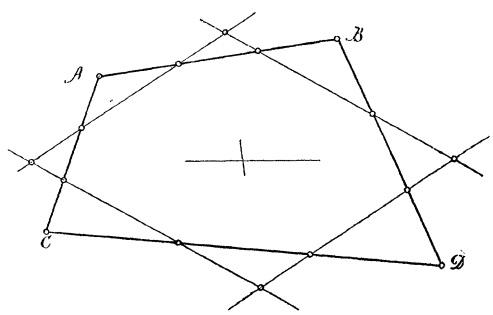
SHORTER ARTICLES.

CENTROID OF A QUADRANGLE.

So far as I can ascertain, the following construction is new. If it be old, it would seem worth while to recall attention to it.

To find the centroid of any quadrangle *A*, *B*, *C*, *D*, divide each side into three equal parts, and draw lines through adjacent points of division, as indicated in the figure. It is easy to prove that the new figure is a parallelogram, the center of inertia of which coincides with the center of inertia of the original quadrangle, both occurring at the intersection of the diagonals of the parallelogram. The areas of the two figures differ.



In that admirable digest, 'Des Ingenieurs Taschenbuch herausgegeben vom Verein Hütte,' 17th edition, no less than thirteen constructions are given for finding the centroid of quadrangular figures. It would seem to me that one convenient and easily memorized construction should suffice, and that the space thus saved should be otherwise utilized.

G. F. B.

EFFECT OF DIMINISHED AIR-PRESSURE ON THE PULSE.

To the Editor of Science: In a recent trip to the summit of Pikes Peak I made some observations on the rate of my pulse which show a rapid increase of beat corresponding with a rapid decrease of pressure. The ascent was made from Manitou on the cog railway, and as I was comfortably seated all the way and spent most of the time looking from the car window, the influence of exercise on the results was eliminated, because there was no change in this respect. The train stopped after each climb of about 2,000 feet to take on water and at these stops I took the rate of my pulse. The heights of the different points are taken from a guide furnished by the railway company, and these with the number of observed pulse beats per minute are given in the accompanying table.

Rate of Pulse per Minute.

Name of Station.	Height in Feet.	Rate of Pulse.	
		Ascent.	Descent.
Manitou.	6,662	78	78
Half Way House.	8,907	...	83
Gulch Tank.	10,067	85	85
Windy Point.	12,233	...	90
Summit Pikes Peak.	14,147	92	92

It is seen that the pulse increased regularly to the summit and decreased to the same amount on the way down. When near the summit I asked a lady sitting near me to give me her pulse rate and she found it the same as my own, namely, 92 per minute.

The average rate of my pulse at the same time of the day (near mid-day) at sea level is about 75.

The ascent was made on September 1, and the time occupied in the ascent and return was about four hours, between noon and 4 P. M. About an hour and a half was taken for the ascent and about an hour and a half for the descent, leaving about an hour for remaining on the summit.

I did not notice any difficulty of breathing while on the summit of the Peak, or any sensations markedly different from those experienced at sea level.

On the day of my visit the Peak was between two strata of cumulus clouds. One was evidently formed over the plateau to the west of the Peak and floated over some distance above the summit. The other stratum was formed over the plains to the east and was far below the summit of the Peak.

Henry Helm Clayton.
Blue Hill Observatory,
October 7, 1901.

NOTES ON INORGANIC CHEMISTRY.

The nature of an antimony salt described in 1882 by Setterberg has lately been cleared up by Wells and Metzger, writing in the *American Chemical Journal*. This salt was formed by the

addition of cesium chlorid to a solution containing both the trichlorid and the pentachlorid of antimony, and was considered to be a mixed salt. In recovering cesium from some residues containing antimony, the authors precipitated it as the chloroplumbate. Instead of being yellow, like the pure salt, the lead salt was bright green, and examination showed that it was colored by an antimony salt, which was isomorphous with it. This proved to be Setterberg's salt, and showed from its isomorphism that its constitution is Cs_2SbCl_6, containing therefore quadrivalent antimony. It crystallizes in black octahedra and belongs to the series of salts of which the most familiar member is the potassium chloroplatinate. This is the first known salt in which antimony is quadrivalent, although in the dioxid this valence is accepted by many chemists.

AN interesting application of the bioscope in crystallography is described in a paper recently presented to the American Academy of Arts and Sciences, by Professor Richards, of Harvard University, in conjunction with E. H. Archibald. The authors have studied the growth of crystals by photomicrography, taking successive instantaneous photographs of the growing crystal. This was accomplished with a very considerable degree of success, after overcoming very great mechanical difficulties. The object was especially to study the birth of crystals in order to determine whether crystallization is always preceded by the separation of an initially liquid phase, consisting of a supersaturated solution of the former solvent in its former solute. A number of observers have believed that with high microscopic powers they have detected the formation of minute globules at the moment of precipitation, and that these globules have soon joined and assumed crystalline form. The problem seemed possible of solution by taking a series of photographs of a solution just at the point of crystallization, and a large number of such photographs were obtained. The enlargement was over 4,000 diameters and both common and polarized light were used. In every case the earliest appearance of the crystal was distinctly crystalline, and no signs of globules were found. Hence if these occur preceding the crystal phase, they are too small to be detected in a microscope of the power used. Incidentally it was found that the growth in diameter in the first second of the crystal's existence was vastly more rapid than during the subsequent period. "This exceedingly rapid initial diametric growth accounts for a lack of definition noticed in the first images—a lack of definition sufficient to have misled the eye, but not enough wholly to obscure the photographic evidence of crystalline structure." The same apparatus is now being used for the study of the change in the structure of steel at high temperatures.

THAT the question of the influence of boric acid and borax upon the health has not yet been definitely settled is evidenced by two papers on the subject, which have recently appeared in the *Journal of Hygiene* and the *British Medical Journal*. The first of these, by Tunnicliffe and Rosenheim recounts a series of experiments upon children, continued for twelve days, and the authors draw the conclusion that these substances are practically harmless. The other paper by Gruenbaum combats the deductions of the former, chiefly upon the grounds that the experiments were too few, continued for too short a period and were upon children over the age when milk is the principal article of food. In the author's opinion the fact that the boric acid and borax were rapidly excreted by the kidneys is evidence of their poisonous character.

IN a recent number of the *Comptes Rendus* Chaveau and Tissot answer the question as to whether an atmosphere which has been rendered deleterious by the presence of hydrogen sulfid can act as a poison through the skin or the outer mucous membrane, in the negative. A dog, with a canula connected with the outside air in its trachea, was placed in a closed box containing more than eight per cent. of hydrogen sulfid. After an hour the dog was still in good condition, while another dog not thus protected, succumbed in the poisonous atmosphere almost instantly. The authors conclude from this experiment that hydrogen sulfid acts as a poison only when taken into the lungs.

J. L. H.